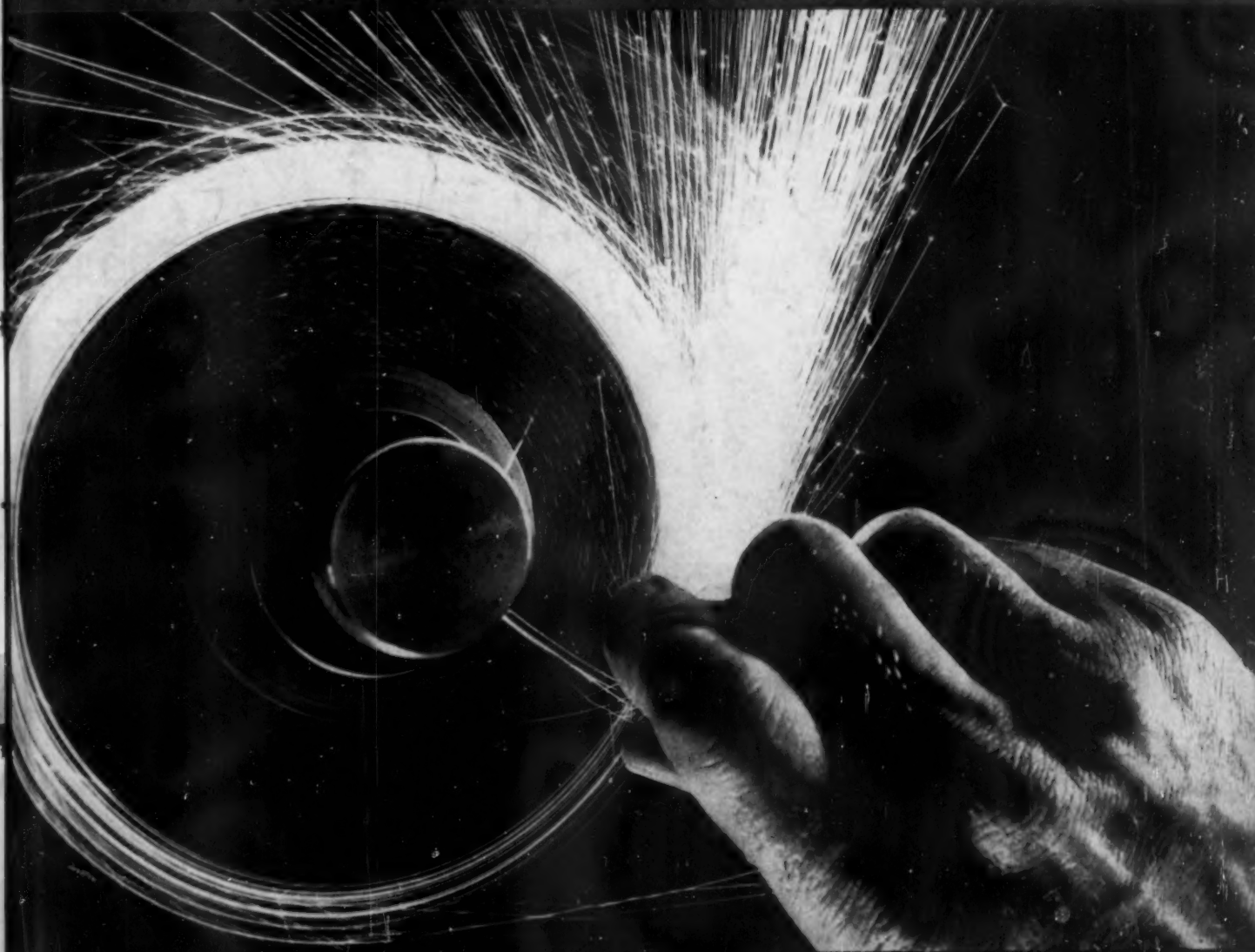


15¢

FEBRUARY 11, 1950

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Outmoded Sparks?

See Page 91

A SCIENCE SERVICE® PUBLICATION

\$3.00 A YEAR

VOL. 37 NO. 6 PAGES 81-96



New scintillation counter, using electron tube developed at RCA Laboratories, gives faster, more accurate measurements of atomic radiations.

## *What can you hear through an **ear of grain**?*

When agriculturists want to learn what nourishment a plant is getting, they inject radioactive materials into the soil and trace their absorption with sensitive instruments. Industry and medicine also use this ingenious technique to gain needed knowledge.

Until recently, scientists literally *heard* what was happening, for they followed the passage of atomic materials through plants or machines, or even the human body, with a clicking Geiger counter. Now a more sensitive instrument — a new scintillation

counter made possible by a development of RCA Laboratories—can do the job more efficiently.

Heart of this counter is a new multiplier phototube, so sensitive that it can react to the light of a firefly 250 feet away! In the scintillation counter, tiny flashes, set off by the impact of atomic particles on a fluorescent crystal, are converted into pulses of electrical current and multiplied as much as a million times by this tube.

See the newest advances in radio, television, and electronic science at RCA Exhibition Hall, 36 W. 49th St., New York. Admission is free. Radio Corporation of America, Radio City, N. Y.



The principle of RCA's multiplier phototube is also used in the super-sensitive RCA Image Orthicon television camera, to give you clear television pictures in dim light.



**RADIO CORPORATION of AMERICA**  
*World Leader in Radio — First in Television*

## NUCLEAR PHYSICS

# Superbombs Due for Tests?

Three or four superbombs will probably be tried. AEC research is now gleaning the basic information needed for the hydrogen bomb.

► THE big question about the superbomb—or superbombs—is how soon it can be built and tested.

Plans and research for superbombs have been in the AEC laboratory, if not actually on the drawing boards, for at least three years, possibly more.

There will probably be at least three or four superbombs tried. For there are several atomic reactions that have in them engaging amounts of mass that can be transformed into energy, if conditions such as millions of degrees temperatures and split-second reaction are fulfilled. For instance, there is the well-recognized combination of two atoms of deuterium, the D-D reaction, which is favored in the speculation because it happens at a lower temperature than most, a mere million degrees or so which an ordinary fission (uranium or plutonium) bomb could provide as a fuze.

Equally inviting in the tables of energies of disintegration of atoms (in any science library) are such reactions as that in which an ordinary atom of lithium is combined with an atom of deuterium (heavy hydrogen) to make one of the kinds of beryllium atoms and give off a neutron. This actually releases five times as much energy as the D-D reaction. Beryllium, another light metal, also could produce lots of energy if it combined with deuterium.

The scientists have many combinations to try. There is also a plentiful supply of these light chemical elements to use if the superbombs go into production—much more of them than uranium.

## AEC Research

The Atomic Energy Commission through its researches on the nuclei (hearts) of light elements is getting the basic information needed for the hydrogen bomb. This is made clear in the seventh semi-annual AEC report to Congress.

The simplest of all interactions between atoms—two protons or hydrogen hearts smacking into each other—is occupying the time of two atom smashers at Berkeley, Calif. Scientists admit that they do not yet have a satisfactory mathematical description of the force between protons and that present theory must be modified.

Atoms of mass three, both of hydrogen and helium, are being produced at Argonne Laboratory, near Chicago, because they are so useful in investigations.

Interactions between protons, deuterons, tritons, helium 3 nuclei, and alpha particles are being studied. Deuterons, which are mass 2 hydrogen atomic hearts, reacting with each other provide the simplest energy-releasing reaction so far suggested as the basis of the so-called hydrogen bomb (See

SNL, Feb. 4, p. 69). The fact that the report mentions them is considered interesting, although the so-called D-D reaction is not specifically mentioned.

Other innocuous-sounding experiments reported are aimed at understanding how atoms interact to form molecules. Hydrogen is being used because it makes the simplest of molecules. The three kinds of hydrogen, masses 1, 2 and 3, produce six different kinds of hydrogen molecules when they combine two and two. Scientists are catching the spectra (rainbows) of these various molecules to determine the motion of electrons within them. These motions are responsible for the inter-atomic forces which come into play to hold matter together or split it asunder.

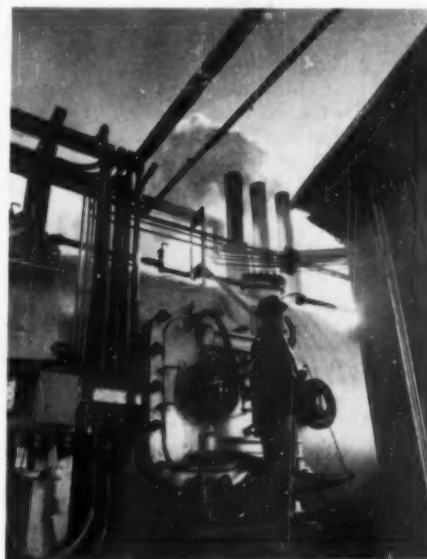
Scientists can split an atom and manufacture matter heavier than any they had in the beginning. University of California accelerators have produced atomic "chips" consisting of three protons which have been glued immediately into another element, making it gain three mass units. This may find application in the manufacture of new kinds of elements of practical worth, just as plutonium is now manufactured out of non-fissionable uranium.

Science News Letter, February 11, 1950

## AERONAUTICS

## Test Chamber Simulates Air Speeds and Altitudes

► TESTING chamber for ram-jet engines, in which air speeds of 2,600 miles an hour can be obtained and altitude conditions up to 80,000 feet simulated, was revealed by



**TEST CHAMBER**—The center section of the test chamber shows the access door and some of the lead-ins for instrumentation lines. The two hoses attached to the door are part of a cooling system which jackets the entire chamber with a layer of water.

## NUCLEAR PHYSICS

# Bomb Threat to Civilization

► "BEFORE deciding whether it should be made, the American people must be aware of the fact that a bomb 1000 times stronger than the Hiroshima bomb might easily destroy civilization."

This warning comes from Dr. Hans Bethe, of Cornell's Laboratory of Nuclear Studies, famous for his theory of atomic energy transformations that keep the sun and stars stoked. Dr. Bethe made his comment in response to a request for an evaluation of the supposed superbomb possibilities, and it was prepared before President Truman's Jan. 31 statement that superbomb work would continue.

"The D-D reaction is theoretically capable of releasing substantial amounts of energy," Dr. Bethe said. This reaction is between the hearts of heavy hydrogen, the atom of mass two called deuterium, a process first discussed 15 years ago and believed to be basic to the so-called hydrogen bomb.

"It requires high temperature comparable to the interior of the stars, but the required temperature is less than for any other nuclear reaction between charged particles," Dr. Bethe added.

"The only theoretically possible way to reach necessary temperatures on earth is use of the fission bomb as a starter, but whether the D-D reaction can actually be started this way is unknown."

This D-D reaction is not the same as Dr. Bethe's theory that explains the heat of the sun by a cycle of nuclear changes involving carbon, hydrogen, nitrogen and oxygen, leading eventually to the formation of helium. Dr. Bethe's theory is called "generally accepted" in the famous Smyth report of 1945.

Both of them, as well as the fission bomb nuclear reaction, depend for released energy upon the conversion of a small amount of the mass into energy, according to Einstein's mass-energy equivalence.

Science News Letter, February 11, 1950



the Wright Aeronautical Corporation in Wood-Ridge, N. J. It was developed for the U. S. Air Force.

The test chamber is 12 feet in diameter and 96 feet long. Air, supplied by turbine compressors in the adjacent turbine laboratory, is directed at supersonic speeds through a mouth, 20 inches in diameter, at the front of the chamber into the air intake duct of the ram-jet engine. Pressurized steam, at the rate of 150 tons per hour, is vented into the chamber's exhaust system to aid in the escape of exhaust gases and to reduce pressure in the chamber, thereby simulating high-altitude conditions.

Ram-jet engines are used as supplementary power in speedy planes. It is the simplest engine in use and provides more

thrust per pound of engine weight than any other type of aircraft power plant. However, it can not operate in flight until sufficient speed has been obtained to enable it to scoop up enough air for combustion. The speed of the plane on which it is used provides the necessary speed.

It can be used in a missile when given initial speed by rockets. In stationary position on the ground, it operates only when high-speed air is forced into its air intake. The ram-jet has been called a "flying stove pipe," because in its simplest form it is a hollow tube in which combustion takes place. The engine itself, exclusive of the fuel system, has no moving parts and consequently needs no lubrication.

Science News Letter, February 11, 1950

#### MEDICINE

## Aureomycin Fights A-Rays

➤ AUREOMYCIN, the golden-yellow drug from a mold, may become one of our best weapons against atomic bombs.

It has already shown ability to cut the death rate from killing and near-killing doses of radiation in rats and dogs.

This "highly important advance" in medical defense against death from the radiation effects of atom bombs was made at the Atomic Energy Project at the University of Rochester (N.Y.). It was disclosed in the report of the Atomic Energy Commission.

Following this discovery of aureomycin's anti-radiation effects, the effects of other antibiotics, such as penicillin and streptomycin on acute radiation sickness are being studied.

These drugs had already been considered as valuable medical weapons in case of atomic attack because of their ability to control infection. Persons damaged by radiation are markedly sensitive to germ infection. Many of the Japanese victims at Hiroshima and Nagasaki developed extensive

ulceration and blood poisoning because of this post-radiation sensitivity to infection.

Lead shields around the spleen and inhalation of nitrogen instead of air are other measures which AEC scientists found decreased the death rate in experimental animals. Lead belts, reminiscent of gangsters' bullet-proof vests, might be worn by anyone expecting an atomic attack but breathing nitrogen instead of air is hardly practical, since it would lead to death by suffocation instead of by radiation.

Science News Letter, February 11, 1950

#### AERONAUTICS-ENGINEERING

## Sheet Metal "Thin Man" Used in Test Crashes

➤ A "THIN man" built out of sheet metal can test the stresses on the human body that occur during an airplane crash. The thin man was reported by E. R. Dye, head of the development division of Cornell

University Aeronautical Laboratory, to the Institute of the Aeronautical Sciences.

Made from three sheets of aluminum, the thin man helps to determine the effectiveness of body control devices in airplanes and measure head impacts during crashes.

Science News Letter, February 11, 1950

## RADIO

Saturday, February 18, 3:15 p. m., EST

"Adventures in Science" with Watson Davis, director of Science Service, over Columbia Broadcasting System.

Mr. Davis will interview nine talented teenage youngsters, winners of Washington trips in the Ninth Annual Science Talent Search.

## SCIENCE NEWS LETTER

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## Question Box

#### DENTISTRY

What is the latest method for fighting caries? p. 92.

#### GENERAL SCIENCE

How many boys and how many girls were STS winners? p. 85.

#### MEDICINE

Against what is ACTH now being used? p. 92.

Photographic Credits: Cover, Atomic Energy Commission; p. 83, Wright Aeronautical Corporation; p. 85, British Museum of Natural History; p. 87, General Electric; p. 90, Dr. Nathan Grossman; p. 96, Tennessee Eastman Corporation.

What is the latest possible weapon which may be used against atomic rays? p. 84.

#### METEOROLOGY

What leading scientist thinks that rain-making is a probable solution to the water shortage? p. 87.

#### NUCLEAR PHYSICS

What are possible atomic reactions that might be utilized in making superbombs? p. 83.

## GENERAL SCIENCE

# Scientists of Tomorrow

Nine girls and 31 boys have been invited for an all-expense trip to Washington to compete in the finals for scholarships totaling \$11,000.

► THE forty most promising young scientists in America's high schools have just been selected in the ninth annual Science Talent Search. The winners—nine girls (including two of a set of triplets instead of a pair of twins) and 31 boys—have been invited to Washington for a five-day all-expenses-paid visit March 2 through March 6.

They will participate in the Science Talent Institute and compete for \$11,000 in Westinghouse Science Scholarships in the finals of the Science Talent Search conducted by Science Clubs of America, administered by Science Service.

The 40 trip-winners, 15 to 18 years of age, were chosen by a panel of judges after a nation-wide competition in which top-ranking seniors in all the public, parochial and private schools in the continental United States were invited to participate. Entrants, representing every state in the Union, totaled 13,585, of whom, 2,245 completed the stiff science aptitude examination, submitted recommendations and scholarship records and wrote an essay on "My Scientific Project."

At the end of the winners' five-day stay in Washington, March 2 through March 6, the judges will award the scholarships. One boy or girl will receive the \$2,800 Westinghouse Grand Science Scholarship (\$700 per year for four years). The runner-up will receive a \$2,000 Westinghouse Science Scholarship. Westinghouse Science Scholarships, ranging in size from \$100 to \$400 and bringing the total to \$11,000, will be awarded at the discretion of the judges to the rest of the winners.

The scholarships may be used at any college, university or technical school of the winners' choice so they may continue their training in science or engineering.

Chosen without regard to geographic distribution, the 40 trip-winners come from 25 localities in 15 states. All of the states represented have had winners in previous Searches. The total of states represented by winners since 1942 is 38.

Six high schools in the United States have produced more than one winner this year. Leading is Stuyvesant High School in New York City with four boys invited; Abraham Lincoln High School in Brooklyn will send three boys. Kenmore (N. Y.) High School, the Bronx High School of Science in New York City and Brooklyn Technical High School of Brooklyn will each send two boys. One boy and one girl have been invited from the High School of Music and Art in New York City.

Twenty-three of the winners this year

come from schools that have never before placed winners in the annual Science Talent Search. The other 17 among this year's winners are adding new laurels to schools already honored by having produced winners in the past.

Of the 360 winners (40 per year) named in the first nine Science Talent Searches, 15 have come from the Bronx High School of Science and 13 from Stuyvesant High School. Forest Hills (N. Y.) High School has sent 11 winners in previous contests, and six have come from Abraham Lincoln High School. Brooklyn Technical High School has produced five and Midwood High School in Brooklyn has had four winners up to now. The following schools have had two winners each in the past nine years: Huntington (N. Y.) High School, Springfield (Oreg.) High School and North Phoenix High School in Phoenix, Ariz.

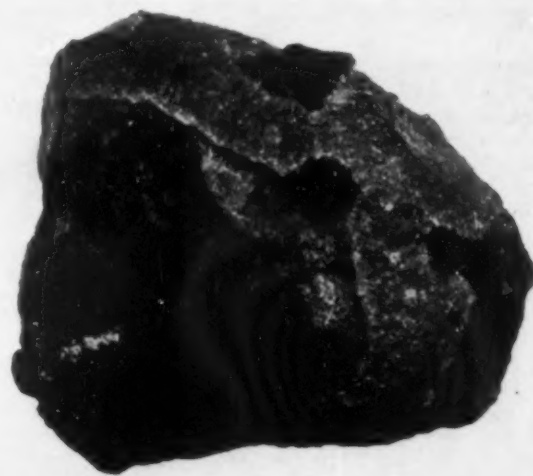
Most of the winners live at home and attend their local or nearby public, parochial or private secondary schools.

Over half (55%) of the Science Talent Search trip winners rank first, second or third in their graduating classes, which range in size from 17 to 504 students. Approximately 57% of the winners' fathers and 35% of their mothers attended colleges. A number have parents who were born or educated abroad and some of the winners themselves are of foreign birth. Relatively few, only 11, claim scientists in the family.

Contrary to a frequent conception of scientists, the winners are not interested in science only. While most of them spend much of their spare time in science pursuits such as science clubs and individual hobbies of a scientific nature, all of them have participated in varied extracurricular interests such as music, athletics, journalism and dramatics, and all belong to social and educational organizations outside their school work.

Many of the top 40 have already chosen the lines of study and research they wish to pursue. Physics attracts 14, while four intend to study chemistry. Others plan careers in mathematics, astronomy, ichthyology, engineering, geology, genetics, medicine, biology, biochemistry, ornithology, botany, bacteriology, electronics, parasitology, entomology and histopathology. All plan research in their respective fields.

Most of the 320 winners in the eight Science Talent Searches held since 1942 are



**BEDDGELERT METEORITE**—The 1½ pound meteorite which fell through the roof of the Prince Lewellyn Hotel, Beddgelert, Carnarvonshire, on September 21, 1949, is shown above. Only large meteorites survive the passage through our atmosphere and reach the earth, and there are only between 1300 and 1400 instances of these known throughout the world, only eleven meteorites recorded as having fallen in Britain. The photograph shows how much of the thin black crust has been broken off, probably on impact with the roof of the hotel or the rocks above.

undergraduate or graduate students in colleges or universities where they are preparing themselves for scientific careers. A total of 152 now have undergraduate degrees, 23 have master's degrees and four are Ph.D.'s. Eight are M.D.'s. A total of 51 are now employed full-time in science jobs in industry or professions, or are on university teaching or research staffs. None of the 320 previous winners is more than 26 years old.

### Honorable Mentions Named

Honorable Mentions in the Ninth Annual Science Talent Search have been named. Girls number 57 of the 260 outstanding seniors in the list, and 203 are boys; the division was determined by the ratio of girls to boys who participated in the competition.

The 260 young people to whom Honorable Mention listing was given reside in 156 communities, located in 35 states and the District of Columbia.

All 300 (40 winners; 260 honorable mentions) selected for honors will be recommended as candidates for matriculation to scholarship-awarding colleges and universities.

In the eight preceding Science Talent Searches, most of the students named in the Honorable Mentions list have been offered scholarships, and many of those named this year will qualify for valuable scholarships and other financial aid in the colleges, universities and technical schools of their choice. The judges found all 300 winners to be students of outstanding ability.

Students in the Honorable Mentions list invariably rank high in their high school graduating classes: 43% of the boys and 60% of the girls stood first or second among their classmates. All the boys and girls have studied some science and/or mathematics for three years or more in high school.

Through an arrangement with Science Clubs of America, 16 areas are conducting state Science Talent Searches concurrently with the national competition. In these 16 areas all entries in the national Science Talent Search will be turned over to state judging committees. From their entries they will choose state winners and award scholarships to various colleges and universities within the state. Cooperating areas are: District of Columbia, Georgia, Illinois, Indiana, Iowa, Louisiana, Minnesota, Montana, New England (all six states included) Pennsylvania, South Dakota, Tennessee, Texas, Virginia, West Virginia and Wisconsin.

The Annual Science Talent Search is conducted by Science Clubs of America, administered by Science Service. Scholarships are provided and the Science Talent Search made financially possible by the Westinghouse Educational Foundation, an organization endowed by the Westinghouse

### GENERAL SCIENCE

# STS Winners Are Selected

#### Phoenix

McKinney, Alice 16 North Phoenix H. S.

#### Beverly Hills Pasadena

Rosen, Victor Joseph, Jr. 16 Beverly Hills H. S.  
Fuchs, Ronald 18 John Muir College H. S.

#### Seymour

Tift, William Grant 17 Seymour H. S.

#### Kellogg

Elliott, Noel Penney 18 Kellogg H. S.

#### Gary

Finegan, Joel Dean 18 Horace Mann H. S.

#### Dorchester

McPortland, Winifred 18 Msgr. Ryan Memorial H. S.

#### Jersey City

Krongelb, Sol 17 Henry Snyder H. S.

#### Albany Brooklyn

Beaver, William Thomas 17 The Albany Academy  
Rosler, Lawrence 15 Brooklyn Technical H. S.  
Wasserman, Edel 17 Brooklyn Technical H. S.  
Korenman, Stanley George 17 Abraham Lincoln H. S.  
Siegel, Jerome 16 Abraham Lincoln H. S.  
Zeidenberg, Phillip 17 Abraham Lincoln H. S.  
Lubell, David 17 Midwood H. S.  
Gordon, Malcolm Stephen 16 New Utrecht H. S.  
Steiner, Lisa Amelia 16 Forest Hills H. S.  
Markoff, Nicholas George 15 Huntington H. S.  
Warren, Alice Janet 16 Ithaca H. S.  
Detenbeck, Robert Warren 16 Kenmore Senior H. S.  
Malone, Dennis Philip 17 Kenmore Senior H. S.  
Feinberg, Gerald 16 Bronx H. S. of Science  
Glashow, Sheldon Lee 17 Bronx H. S. of Science  
Jackson, Cynthia Betty 17 H. S. of Music and Art  
Sternberg, Saul Herbert 16 H. S. of Music and Art  
Jackson, Patricia Alice 17 Hunter College H. S.  
Cohen, Paul J. 15 Stuyvesant H. S.  
Lubkin, Elihu 16 Stuyvesant H. S.  
Posner, Edward Charles 16 Stuyvesant H. S.  
Sussman, Alan 16 Stuyvesant H. S.  
Taylor, Lenore Yvonne 17 Utica Free Academy

#### Utica

#### Cincinnati Sylvania

Martin, Donn Robert 17 Mariemont H. S.  
Rippon, John Willard 17 Burnham H. S.

#### Portland Springfield

Franchere, Julie Victoire 16 St. Helen's Hall  
Reeves, William John, Jr. 17 Springfield H. S.

#### Philadelphia

Wyeth, Cynthia Walton 16 Springfield Twp. H. S.

#### Woonsocket

Wawszkiewicz, Edward John 16 Mt. Saint Charles Academy

#### Kimball

Piskule, Donald Frank 18 Kimball Consolidated H. S.

#### Oak Ridge

McCormick, Donald Bruce 17 Oak Ridge H. S.

#### Deming

Gunter, William Dayle, Jr. 18 Mt. Baker H. S.

### ARIZONA

North Phoenix H. S.

### CALIFORNIA

Beverly Hills H. S.

John Muir College H. S.

### CONNECTICUT

Seymour H. S.

### IDAHO

Kellogg H. S.

### INDIANA

Horace Mann H. S.

### MASSACHUSETTS

Msgr. Ryan Memorial H. S.

### NEW JERSEY

Henry Snyder H. S.

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### TENNESSEE

McCormick, Donald Bruce 17 Oak Ridge H. S.

### WASHINGTON

Gunter, William Dayle, Jr. 18 Mt. Baker H. S.

Electric Corporation, for the purpose of promoting education and science.

Science Clubs of America, administered by Science Service, is the international organization for science groups, in schools and out. Today more than 15,000 clubs are affiliated here and abroad, with a membership of more than one-third of a million young people.

Science Service is the non-profit institution for the popularization of science, with trustees nominated by the National Academy of Sciences, National Research Council and the American Association for the Advance-

ment of Science, the E. W. Scripps Estate and the journalistic profession.

The judges of the Science Talent Search are: Dr. Harlow Shapley, director of the Harvard College Observatory and president of Science Service; Dr. Harold A. Edgerton, vice president, Richardson, Bellows, Henry & Co., and Dr. Stuart Henderson Britt, director of personnel, McCann-Erickson, Inc., both psychologists of New York City; and Dr. Rex E. Buxton, psychiatrist of Washington, D. C. Drs. Edgerton and Britt design the Science Aptitude Examination each year for the Science Talent Search.

Science News Letter, February 11, 1950



## METEOROLOGY

## d Rain-Making, Pro and Con

Weather Bureau officials feel that artificial rain making will not solve the water shortage problem. Other scientists feel this method offers a very probable solution.

► NO great help for the water shortage problem either in New York or in the western states will come from any attempt at artificial rain making, Ernest Christie, meteorologist in charge, New York Branch, U. S. Weather Bureau, claims.

He differs with Nobel prize winner Dr. Irving Langmuir of General Electric who has declared that it is "highly probable" that the cloud seeding technique of rain making could solve New York's water shortage problem as well as the shortages in the western states.

Mr. Christie asserts that there is always enough natural rain over the New York water shed area. The problem is not to produce more rain, he declares, but to use the rain received properly.

Much the same controversy exists over the water resources of the 17 western states. Dr. Langmuir claims that cloud seeding will help both New York and the western states. Weather Bureau experts declare that he has not proved his case yet and express doubt that he will.

Dr. Langmuir and his associates believe that the meteorologists are being stubborn about accepting their findings. Furthermore, they claim that the meteorologists do not know anything about cloud physics.

The chief of the U. S. Weather Bureau, Dr. F. W. Reichelderfer, is happy to admit that Dr. Langmuir's experiments in seeding clouds with the artificial nuclei around which rain or snow may form are providing valuable new data that the meteorologists can use.

"The general conclusion has been that there are relatively few cases where the lack of nuclei is responsible for the lack of rain," Dr. Reichelderfer asserts. "Dr. Langmuir may have brought new evidence to our knowledge."

Another Weather Bureau meteorologist, William Lewis, assigned to work with Dr. Langmuir on his rain making experiments, is even more positive about nuclei. To Dr. Langmuir's statement that very often there are not enough nuclei for moisture filled clouds to produce rain, Mr. Lewis has a categorical answer. He declares that there are "always sufficient natural nuclei so that with the proper air circulation, ice crystals, which are nature's nuclei, form naturally."

"Artificial seeding, therefore," Mr. Lewis continues, "will not produce an appreciable change in the distribution of rain."

In a paper delivered recently before meetings of the American Meteorological Society, Dr. Langmuir pointed to experiments in New Mexico of seeding clouds

with silver iodized particles. He presented an analysis of radar data, weather bureau rain measurements and measurements of river flow to support his claim that he made it rain in large quantities over New Mexico.

Mr. Lewis points out that on each of the two days in question there was a cold front in the area and a southerly component of winds aloft. Both these conditions, says Mr. Lewis, have a high correlation with rain.

"We made that cold front," asserts Dr. Langmuir, "and there is almost always a southerly component of wind aloft in New Mexico. Also, if our cloud seeding didn't make the rain, why didn't the Weather Bureau predict the rain which occurred on those two days?"

Even though meteorologists feel that Dr. Langmuir goes too far in his claim, they are eager to have cloud seeding experiments continued.

Project Cirrus under which Dr. Langmuir's work has been done is sponsored by Office of Naval Research, the Army Signal Corps and General Electric Research Labo-

ratory. All of them and the Weather Bureau feel that much of the data collected are providing valuable new knowledge on the behavior of moisture in the air.

Science News Letter, February 11, 1950

## ENGINEERING

## Device Counts Parts Passing for Inspection

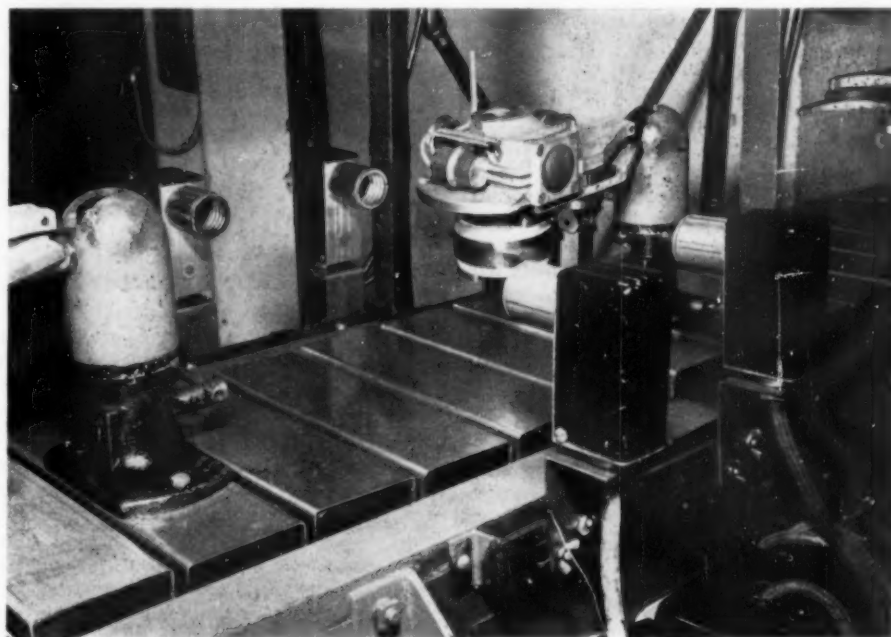
► ELECTRIC eyes count the number of machine parts as they pass on a conveyor belt for inspection, and "rejects" are discarded in the totals, in a new General Electric machine. This "quality control indicator" is already in use in a GE plant at Erie, Pa.

Manufactured articles to be assembled into completed devices, such as compressors for refrigerators, in passing along the line, cut a beam of light from a source on one side directed against a photo-electric cell on the other. Cutting the beam activates the eye which in turn activates a counting apparatus.

When any one of the inspectors on the line finds a defective part, he presses a button. These two signals are registered on the quantity control indicator.

Statistical analysis of production and rejection rates in the past has been made by time-consuming computations, lagging behind production by hours or days. The new instrument eliminates this lag.

Science News Letter, February 11, 1950



**ELECTRICAL INSPECTION**—Refrigerator compressors moving along this assembly line are counted as they pass between light sources (right) and "electric eyes" (left) on either side of the line. The line is monitored by a new instrument called the quality control indicator, which gives an automatic check on quality of material being assembled.

## DENTISTRY

**Teeth Brushing after Meals Is Best Rule**

► TOOTH decay can be cut 50% or 60% by brushing the teeth immediately after eating. Studies showing this are reported by Dr. L. S. Fosdick, professor of chemistry at Northwestern University Dental School, to the JOURNAL OF THE AMERICAN DENTAL ASSOCIATION (Feb.).

The favorable results were obtained with a neutral, unmedicated tooth paste containing dicalcium phosphate as the abrasive, or rubbing, agent. Since the results were good with this dentifrice, it is possible, Dr. Fosdick states, the type of dentifrice and abrasive are not important. A positive statement on this, however, must await results from studies now being made with two other types of dentifrices. One of these other two contains soap and calcium carbonate. The other has an antiseptic in it.

The studies were made on 946 persons, including liberal arts students at Drake University, Simpson College, Emory University, dental students at the University of Louisville, Emory and Northwestern Universities and medical students at the University of Louisville.

The 523 in the experimental group were each told to brush their teeth within 10 minutes after eating food or sweets, and when brushing was impossible to rinse the mouth thoroughly with water. They were also instructed to use an accepted method of brushing and to rinse the dentifrice from the mouth with water immediately after brushing.

Examination of the teeth of this group, and of the 423 who followed their usual dental hygiene methods and served as controls, was done by means of mouth mirrors, explorers, dental floss and air syringe, and X-rays were taken of all teeth. These examinations were repeated at the end of the first and second years during which the experiment ran.

The results bear out and materially strengthen the generally accepted theory of the tooth decay process, Dr. Fosdick points out. This is that decay is started by acid decalcifying the enamel surface under an organic coating or plaque. The acids come from fermentable sugars by the action of enzymes.

Science News Letter, February 11, 1950

## PSYCHOLOGY

**People Are Test-Happy; Tests Not Patent Medicine**

► THE American people are test-happy. Lots of people think that tests are a patent medicine that will cure all of their ills, from the job they just lost to the last fight with the girl friend.

This complaint comes from Dr. Joseph V. Hanna, New York University psychologist.

To make matters worse, the psychologists realize that it is partly their own fault. Some psychologists are themselves a little test-happy. Others do not take enough time explaining what a test can and can not do.

The psychologists are not willing to take all the blame. They think popular magazines are equally guilty. Most of these magazines accentuate the positive. They often make the test seem foolproof because it makes people want to read about it.

The public comes in for its share of scolding too. Have you ever heard a person say that it does not really matter if he is not successful because he has such a high I. Q. that he does not have to prove himself with hard work? Such people love to take tests because it makes them feel good to get high scores.

Others use tests as an excuse. They say that there is no point in trying. They get such low scores that they probably would not succeed even if they did try.

Dr. Hanna, in a recent report to the National Vocational Guidance Association, "takes some comfort in the belief that a large number of these clients are the abnormally frustrated individuals."

The public should get all of the facts about a test—both good and bad, Dr. Hanna urges. Both the public and the psychologists should use common sense about the meaning of a score on a test—even a good test.

Science News Letter, February 11, 1950

## PSYCHOLOGY-POPULATION

**Neurotic Rats Not Prolific; Clue to Population Control?**

► IF you give a rat a neurosis, you won't have to build a better rat trap. Dr. John B. Calhoun, formerly of the Johns Hopkins University School of Hygiene and Public Health now at the Roscoe B. Jackson Memorial Laboratory of Bar Harbor, Me., has determined special patterns and behaviors developed by a controlled colony of Norway rats.

Rats which were able to get at their source of food easily and which were born at times when they did not have to compete with too many other young rats soon climbed to the top of the social heap.

Rats who had to pass a lot of other rats to get to their food—even though they ate enough—had trouble adjusting to the colony's social life. And if they had to compete too much with other rats, they went down in the social scale. Both these conditions produced neuroses and the neuroses evidently had a bad effect on the number of young produced and whether they were able to live to maturity.

In addition to studying the possibilities of controlling rat populations, Dr. Calhoun raised questions of application of his findings to the human population.

Science News Letter, February 11, 1950

**IN SCIENCE**

## METEOROLOGY

**Ground Hog's Forecast as Accurate as Tossed Coin**

► WHETHER the groundhog saw his shadow on Feb. 2 or not will not make much difference in the weather of the next six weeks anyway.

The groundhog is just about as good a long-range weather prophet as a coin tosser—and just about as bad, too. He guesses right about 50% of the time; and any of us could prophesy weather as well as that by flipping a coin.

But then, the groundhog never asked for the job. He had it wished on him by early colonists who brought over a superstition about the hedgehog seeing his shadow on Candlemas day, and the absence of European hedgehogs in America thrust the burden on the groundhog.

Like many another harmless animal, the groundhog is called out of his proper name. He does live in a burrow in the ground, but he is no hog, nor any kin to one. Like that other miscalled mammal, the guinea pig, he is more nearly related to the rabbits, which he resembles in his ceaseless nibbling at grass and other herbage. Under another alias, he is the woodchuck, that mythical manipulator of problematical quantities of timber. A third name, and really one more dignified and becoming to the animal, is marmot; but it is much less used.

Science News Letter, February 11, 1950

## GENERAL SCIENCE

**Agreement to Facilitate Exchange of Materials**

► GETTING educational motion pictures, radio program platters, and other teaching materials across national boundaries will be easier in the future when an international agreement sponsored by UNESCO finally goes into effect.

Already 16 nations have signed the agreement, but it will not go into effect until at least 10 of them have passed the necessary legislation to modify their own customs restrictions which in many cases means days of delay and the filling out of many forms and papers.

The United States National Commission for UNESCO in Washington, D. C., explained that Congress would have to approve the agreement. Ways in which to get better exchange of educational, scientific, and cultural materials among the various nations will be considered at a meeting to be held in Geneva in March.

Science News Letter, February 11, 1950



# NIE FIELDS

## MEDICINE

### Inhalations Stop Expected Migraine Headache

➤ MIGRAINE headaches can be stopped before they start by inhalations of a mixture of carbon dioxide and oxygen.

Results of trial of this simple measure in 15 patients are reported by Drs. Robert M. Marcussen and Harold G. Wolff of New York in the ARCHIVES OF NEUROLOGY AND PSYCHIATRY (Jan.), medical journal published in Chicago, Ill., by the American Medical Association.

The treatment was given by having the patients lie down and inhale the gas mixture through a face mask for three periods of five minutes each.

The visual disturbances which come before the headache in typical migraine attacks were cleared completely by the carbon dioxide-oxygen inhalations and the expected headache did not develop. One patient had extreme sleepiness and nausea as a pre-headache symptom. While inhaling the gas mixture she became alert, her nausea disappeared faster than usual, and headache did not develop.

Once the headache has developed, the "results were unpredictable," so that patients cannot count on getting relief if they start the inhalations after that stage in the attack, though some of them may.

Science News Letter, February 11, 1950

## ENGINEERING

### New Rectifier to Promote Electric Locomotive Use

➤ WIDER use of electrical locomotives on railroads was predicted by Westinghouse engineers at the meeting of the American Institute of Electrical Engineers. A new rectifier, to change alternating electric current to direct current, will be responsible.

With this rectifier type motive power unit, a high voltage trolley wire can be used, thus making it possible to supply, economically, large blocks of power over long distances for heavy concentration of traffic.

The rectifier unit was described as having all the advantages of the high voltage alternating-current (A-C) trolley system with the simplicity and flexibility of voltage control plus the advantage of the direct-current (D-C) traction motor. Furthermore, it has the ability to develop high accelerating horsepower at high speed even more economically than is possible with the A-C series of motor motive power unit.

The Westinghouse engineers who described the new rectifier unit were L. J. Hibbard, C. E. Whittaker and E. W. Ames,

all of the company's plant at East Pittsburgh, Pa. Laboratory and practical tests are now being correlated and analyzed and preliminary results only are now available, they stated.

As to diesel electric locomotives they said: "The price of electrical energy has been relatively stable, whereas the long term trend of liquid fuel prices has been upward. Where economic conditions justify the electrification of a dieselized railroad, the diesel electric locomotives can be transformed into rectifier locomotives by removing the diesel engines and their appurtenances and applying pantographs, transformers, auxiliaries and rectifier equipment."

Science News Letter, February 11, 1950

## INVENTION

### Soybean Vegetable Gel Used in Food Preparation

➤ WIDER use of soybean as a food is promised with a vegetable gel patented recently which contains the protein contents of the bean in gelling constituents from which foods containing meat or puddings may be prepared easily and simply.

The patent issued covers both the vegetable gel and the process by which it is obtained. Its number is 2,495,706. Recipients were Letta I. De Voss and Arthur C. Beckel, of Peoria, and Paul A. Belter, Pekin, Ill. Rights are assigned to the U. S. Department of Agriculture and the gel may be made by the government in any part of the world without the payment of royalties.

In general, the process involves providing an alcohol-extracted proteinaceous soybean residue free of alcohol-soluble matter. Water is used to extract a sufficient quantity of this residue. Fibrous, insoluble soybean material is removed, then the mixture is spray-dried to a solid, powdery material.

Science News Letter, February 11, 1950

## AERONAUTICS

### 3,500-Mile-per-Hour Wind Tunnel at Princeton

➤ A UNIQUE 3,500-mile-an-hour supersonic tunnel is in operation at Princeton University.

Described as a Variable Density "Blow-Down" type, it utilizes a storage tank in which air is compressed by the use of relatively low horsepower over a period of hours. Once the air has been compressed, it can be discharged at high velocity through a supersonic nozzle.

With test-times ranging from one to 15 minutes, this new tunnel uses two 100-horsepower compressors. It is relatively low in initial cost in comparison with the more common continuous flow type tunnel. It is approximately 45 feet long, with the settling-chamber and working sections occupying some 20 feet.

Science News Letter, February 11, 1950

## GENERAL SCIENCE

### Remarriage of Science And Philosophy Asked

➤ HOW to remarry science and philosophy, divorced since the 18th century, is the problem posed to college students in an essay contest announced by the Institute for the Unity of Science, of which Prof. Philipp G. Frank of Harvard is president. Prizes totalling \$500 are offered, for entries during this year.

"Science and philosophy were not distinguished sharply in antiquity," Dr. Frank explained. "Subsequently, philosophy came to be regarded as a special branch of knowledge, separated by more or less explicitly formulated boundaries from the various special sciences. The consequences of this separation have been far-reaching and the essays are expected to clarify the issues involved in it."

Science News Letter, February 11, 1950

## MEDICINE

### Long Rest in Bed Advised For Some Heart Victims

➤ REST in bed for "many weeks," contrary to the current tendency to get patients up early, will be prescribed for patients with certain forms of heart disease, if physicians follow the findings of a group of heart specialists at Beth Israel Hospital and Harvard Medical School in Boston, Mass.

The group, Drs. Herrman L. Blumgart, Paul M. Zoll, A. Stone Freedberg and D. Rourke Gilligan, report their researches in the first issue of CIRCULATION (Jan.), new Journal of the American Heart Association.

The patients for whom they advise the longer rest in bed are those who have suffered acute myocardial infarction. This is a condition in which an area of the heart muscle is put out of commission, sometimes because one of the arteries supplying it with blood has become blocked. Nature's method of compensating for this is the development of connections between arteries so that the heart muscle continues to get a supply of blood and can go on functioning as a pump.

These connections between arteries develop slowly, the Boston group has found. It takes time before they are able to supply the blood needed. Reducing the work of the heart is consequently advised, to give time for the development of the new connections between arteries.

The longer period of rest in bed and reduced activity is also advised, on the basis of the Boston group's research, for patients who suddenly develop another kind of heart disease, angina pectoris, or who suddenly begin having more frequent or more severe attacks of angina.

Science News Letter, February 11, 1950

## PHYSIOLOGY

# Heart Is Reliable Pump

A muscle as big as the fist has efficiency to be envied by machine makers. Its strength is due largely to the criss-cross layer structure of the muscle fibers.

By JANE STAFFORD

► HEARTS mean romance and soft music to many, especially in February, but actually the beating heart is a hard-working pump with an efficiency that any pump or motor manufacturer would be proud to achieve.

To equal the heart's efficiency as a motor, a gasoline engine, such as the one in your car, would have to be capable of running one million miles without attention.

## Work Force Is Huge

In one minute the human heart puts out a work force capable of raising a weight of 78 pounds to the height of one foot. Every day it pumps from nine to ten tons of blood, driving this through miles of veins and arteries. In the biblical lifespan of three score years and ten, which many persons now outlive, the heart, pumping at the rate of 72 times a minute, delivers nearly three billion thrusts to pump more than 40 million gallons of blood.

All this power is housed in an organ that measures, on the average, 5 by 3½ by 2½ inches in a grown person. To get an idea of the size of your heart, look at your lightly closed fist. It matches pretty well the heart in your chest, whether you are a tall, big-fisted man or a slender little woman. Your heart is closer to that fist shape, too, than to the shape of the heart on your valentine. Medical books describe the heart as pear-shaped.

## Heart Is Near Center

When you put your hand on your heart to swear allegiance to the flag, or to your love in a sentimental moment, you probably miss the exact location of your heart. It is not so far to the left as many persons seem to think. The base, or broad part, of the heart is directed upward and to the right, with the apex, or narrow end, directed downward and to the left.

## Division of Heart

The heart is a hollow muscle, enclosed in a tough fibrous bag called the pericardium. Between the heart and this bag is a little lubricating fluid for reducing friction. A wall down the middle of the heart divides it into what you may have heard your doctor call the right and left heart.

The reason for this division, which in a way makes the heart into two pumps, is that there are two separate circulations of

blood. One of these is through the lungs and the other through all the rest of the body.

## Blood Returns

After the blood has been through the body, it comes back to the right heart through two big veins, one from the trunk and legs, the other from the head and arms. It goes into the top chamber of the right heart, called the auricle and then through a flap of membrane, or valve, into the right ventricle. From here it is pumped through an artery to the lungs, where it discharges a waste gas, carbon dioxide, and picks up a fresh supply of oxygen.

Two veins, one from each lung, deliver the blood back to the left heart, which also has a receiving chamber, or auricle, and a pumping chamber, or ventricle. From this left heart's ventricle the blood is pumped through the body's biggest artery, the aorta, out to the rest of the body.

## Double Pumping Job

This double pumping job is done simultaneously by the two sides of the heart. The powerful muscles of the two ventricles contract at the same time, to pump blood into the lungs and into the rest of the body.

The impulse for the heart's contraction comes from a small bundle of muscle and nerve cells in the wall of the right auricle. This impulse from this pace-maker travels in waves, first along the walls of the auricles and then along the walls of the ventricles. The auricles therefore start contracting first, followed by the ventricles. The force of the heart's contraction is strong enough to shoot a column of blood six feet into the air.

## Heart Relaxes

After the contracting heart has forced the last drop of blood out of the ventricles, it relaxes. The contraction lasts for three-tenths of a second, the relaxation, or rest period, five-tenths of a second in a heart that beats 72 times a minute. The period of contraction is called the systole, that of relaxation the diastole. You may have heard your doctor speak of systolic blood pressure and diastolic blood pressure. The systolic pressure is the pressure in the arteries when the heart is in systole, or contracted. The diastolic pressure is that in the arteries when the heart is relaxed.

The heart's great strength comes primarily from the kind of muscle of which

it is made. The muscle fibers criss-cross in many layers, running in different directions. This gives them strength in the same way that laminated material gets strength, though it may be made of many thin layers. No other muscle in a man's body has as much power as his heart muscle. Only one human muscle has more power. That is the contracting uterus in a woman's body as she is giving birth to a child.

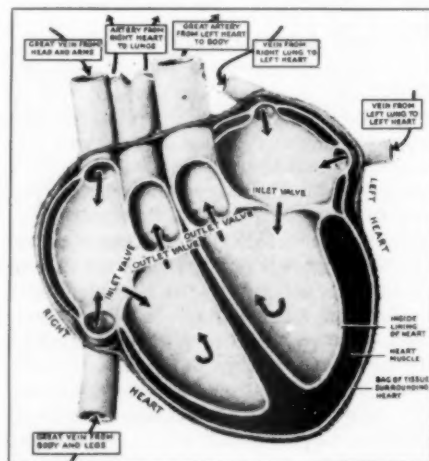
The heart muscle, of course, must have a supply of blood to nourish it for its work of pumping blood out to the rest of the body and through the lungs.

## Arteries Supply Its Blood

The heart muscle does not get its blood directly from that inside the chambers but from arteries, called the coronary arteries, which branch off from the big aorta at the top of the heart. And the heart has veins for carrying blood back into its chambers.

You may have heard of coronary artery disease, or coronary disease as doctors sometimes call it. This refers to disease of these arteries that nourish the heart muscle. Coronary thrombosis is a condition in which one of the coronary arteries is plugged by a clot. A plugged artery obviously cannot carry blood, and the part of the heart it was supplying therefore is no longer able to function.

This is only one of several kinds of diseases that can interfere with the heart's efficiency as a pump or put it out of commission altogether.



**HEART DIAGRAM**—The diagram showing the architecture of the heart was made for the Metropolitan Life Insurance Company and the American Heart Association which this month is conducting a campaign to raise funds for research on heart disease.





**X-RAY HEART**—The very clear view of the heart, the arteries and the veins is obtained by injecting into the arm vein an opaque substance which is carried in the circulating blood.

The fact that the heart acts as a muscular force-pump propelling the blood through the arteries and that the blood returns to the heart through the veins was discovered by the English physician, William Harvey, in 1628. Atomic age medical scientists are now following the course of the blood through the body with radioactive chemicals to label blood cells and Geiger counters to trace them.

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#### NUCLEAR PHYSICS

### Neutron Not Fundamental Particle, But Splits

► THE neutron, trigger of the fission atomic bomb, has lost its distinction of being a fundamental particle of nature, thanks to experiments reported to the American Physical Society by an Oak Ridge National Laboratory team, consisting of Dr. Arthur H. Snell, Frances Pleasanton and R. V. McCord.

Instead of being something that cannot itself be split, this electrically neutral particle, present in the hearts of atoms, decays radioactively after 10 to 30 minutes of freedom into an electron (unit of negative electricity) and a proton (the positive particle that is the center of the hydrogen atom).

Along with the proton, the neutron has long been considered a fundamental building block of atomic nuclei and therefore of all matter. In 1933 two Englishmen found that the neutron was slightly heavier than the proton. They suggested that it could turn into a proton by loss of an electron, what is called radioactive beta

decay, since the electron is called the beta particle.

Now the Oak Ridge scientists have proved this to be the case. The lack of electrical charge on the neutron causes it to pass through all matter with extraordinary ease. It also readily interacts with matter. Neutrons can not be studied like other radioactive material.

A stream of neutrons from the Oak Ridge uranium-graphite reactor or "pile" was used. The electrons and protons into which the neutrons decayed were detected near the powerful neutron beam.

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#### PHYSICS

### Device Records Flying, Resting Time of Birds

► A SMALL radioactive device fastened to the wing of homing pigeons that records how much of the bird's time is spent in flying and how much in resting has been made by Dr. D. H. Wilkinson of Cambridge University's Cavendish Laboratory, Cambridge, England.

When the bird is in flight a stream of alpha particles strikes a photographic plate. When the bird is at rest a steel ball falls into place, sealing off the radiation so that it can not reach the film. When the film is examined under the microscope, the num-

ber of tracks counted gives the bird's flying time.

Dr. Wilkinson has some improvements in mind, including a built-in compass to record direction, and an absorption device to indicate time spent on water. He announced his new flight recorder in a letter to the British journal NATURE (Feb. 4).

Science News Letter, February 11, 1950

### On This Week's Cover

► THE possibilities of producing super-bombs by the D-D reaction, the lithium-hydrogen reaction and the beryllium-deuterium reaction have forced uranium, a little used and little known element before atomic energy development, to assume a secondary role in the production of bombs. However, the atomic bomb may serve to trigger or set off the hydrogen bomb. The surface of a piece of uranium is shown being prepared for microscopic examination at the Battelle Memorial Institute; the many sparks are typical of uranium. Even after the war, knowledge of its metallurgy was no better than that concerning iron and steel in 1870. And today, when the lime-light has shifted from it, the qualities of the high-purity metal are still not well understood.

Science News Letter, February 11, 1950

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## DENTISTRY

# Fluorine Reduces Caries

The addition of fluorine to the water supply has resulted in reducing tooth decay. Yet little is known about the causes of decay or diseases of the gums.

► EXPERIMENTS in adding fluorine to the public water supply have already "shown a definite trend toward a beneficial effect" in reducing tooth decay, Dr. H. T. Dean, director of the government's National Institute of Dental Research, declared.

The Institute has been adding fluorine to the Grand Rapids, Mich., water system for the past five years and will continue to do so for five years more.

"One part per million of fluorine, when it occurs naturally in water, is associated with from 50% to 65% reduction in the prevalence of dental decay among the people who use that water," declared Dr. Dean.

The Grand Rapids experiment, he continued, is to find out whether the same results can be obtained by adding fluorine artificially to the public water supply.

Dr. Dean spoke as guest of Watson Davis, director of Science Service, on the nationwide Columbia network.

If the trend in Grand Rapids continues for another year or so, "we can feel pretty sure that we've found a practical and economical method for reducing—not entirely preventing but considerably reducing—dental decay in large population groups," Dr. Dean said.

The National Institute of Dental Research is a part of the U. S. Public Health

Service and the Federal Security Agency.

Pointing out that our population between the ages of 35 and 60 will increase by 15 million between 1940 and 1980, Dr. Dean called for increased research on periodontal disease, the disease that attacks the gums. As serious as tooth decay, he said, it accounts for most of the teeth that people lose after they're 35 years old.

Very little is known about the causes of either tooth decay or disease of the gums, and very little money is being spent to find out about them.

"The trouble is," said Dr. Dean, "we're spending much less than a penny on dental research for every dollar we pay to the dentist. We're devoting, actually, about a million dollars a year to dental research in this country as compared with \$900,000,000 for dental care."

In that research, he went on, "we're going to have to integrate our dental research workers very closely with workers in the biological and physical sciences. We can't divorce the mouth from the rest of the body, or from any of the factors of nature that affect the body."

Dr. Dean explained that in the Dental Institute, located at Bethesda, Md., half the research workers are dental officers of the Public Health Service, and the other half are scientists with Ph.D. degrees in the basic sciences.

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parallel those in rheumatoid arthritis. The patients get better while under treatment. When the drug is stopped, the eye trouble comes back.

The results show the drug "deserves further investigation" in these eye conditions, the eye specialists, Drs. John M. McLean and Daniel M. Gordon, of New York Hospital-Cornell Medical Center, state in their report to the Association for Research in Ophthalmology.

The particular eye diseases for which they have tried ACTH are inflammatory conditions akin to the inflammatory conditions in rheumatic joints and in rheumatic fever. They reported on only six cases but are continuing their research with ACTH. They have not yet done any work with cortisone, the adrenal gland hormone which was the first of the two now famous anti-arthritis drugs.

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## ENGINEERING

## Radio Sleuth Detects Powerline Trouble

► AN automatic radio sleuth is now in use which tracks down trouble on high voltage power lines in seconds, the electrical engineers were told by Robert W. Hughes and Nelson Weintraub of Federal Telecommunication Laboratories. The system employs pulse time modulation radio relays and prints at a terminal station the time, and location within 600 feet, of high voltage faults that occur anywhere on the line.

The development of this fault-finding system was credited to T. W. Stringfield and R. F. Stevens of the Bonneville Power Administration. The actual equipment was designed and built by Federal Telecommunication Laboratories.

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## MEDICINE

# ACTH Fights Blindness

► ACTH, the anti-arthritis hormone from the pituitary gland, is now entering the fight against blindness.

Cautiously, because the work is still in a very preliminary stage, two New York eye

specialist physicians report trials of the drug in a few cases of iritis, choroiditis and uveitis, inflammatory conditions within the eye.

The effects in these eye disease cases

## NEW SEEING AID IS NOT WORN BY USER!

Works on principle of supplying stronger light at night, from existing lamps. Wonderful for reading, sewing, studying, etc. Two models: 1. LEK-TRO-LENS light magnifier clips on 25 to 100 watt bulbs in lamps, light fixtures, focuses twice the light, helps old and tired eyes (bright young ones too!). Swings to any position. Postpaid, 2 for \$1.00 plus 6c stamps. 2. DAY-BRITE magnifier is like LEK-TRO-LENS but has filter, gives WHITE light similar to daylight. 79c each — 2 for \$1.58. Postpaid.



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## Words in Science—

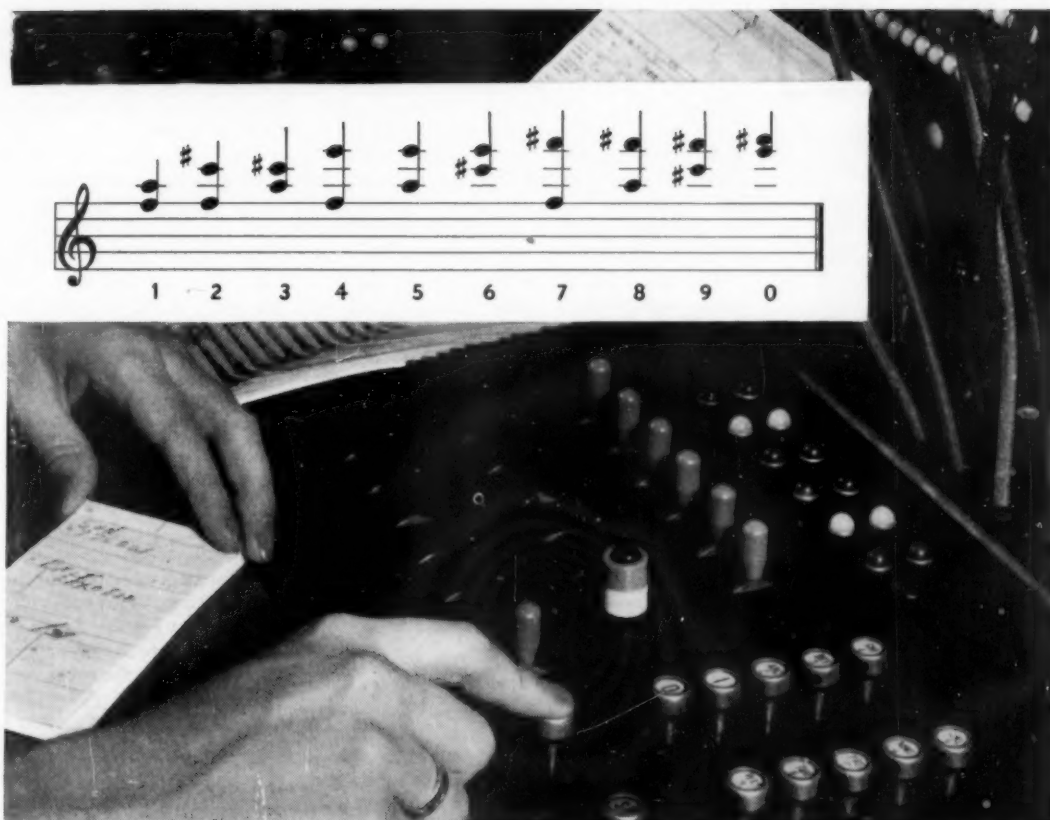
### SYMMETRIC-ASYMMETRIC

► WHEN the parts of a whole are balanced in respect to size, shape or position on opposite sides of a center, the object is said to be symmetrical.

One of the uses of the term in mathematics covers the arrangement of points so that a set of lines joining the points together is divided into equal parts by a line, a plane or a point.

In zoology, symmetry is the arrangement of the parts of animal bodies in relation to a central axis. Jellyfishes are an example of sea animals with radial symmetry. Some one-celled animals are asymmetrical, or not symmetrical. In pronouncing asymmetrical, the accent is on the first and third syllables.

Science News Letter, February 11, 1950



Above is the Bell System's new "musical keyboard." Insert shows the digits of telephone numbers in musical notation, just as they are sent across country.

## Playing a tune for a telephone number

Before you talk over some of the new Bell System long distance circuits, your operator presses keys like those shown above, one for each digit in the number of the telephone you are calling. Each key sends out a pair of tones, literally setting the number to music.

In the community you are calling, these tones activate the dial telephone system, to give you the number you want. It is as if the operator reached across the country and dialed the number for you.

This system, one of the newest developments of Bell Telephone Laboratories, is already in use on hundreds of long distance lines radiating from Chicago, Cleveland, New York, Oakland and Philadelphia, and between a number of other communities.

It will be extended steadily in other parts of the country—a growing example of the way Bell Telephone Laboratories are ever finding new ways to give you better, faster telephone service.

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ZOOLOGY

## NATURE RAMBLINGS



Bats

➤ EONS before the Wright brothers devised an acceptable if imperfect counterfeit of man's eternal dream of flight, one of man's tiniest relatives mastered the problem to perfection.

The bats form a separate order of the class of mammals to which man belongs. They are warm-blooded, the young develop inside the mother, and the mother suckles her offspring.

And they fly. Somewhere along the line of their evolutionary development, the fingers of the forefeet became elongated, and a webbing of skin developed between the finger bones. This exaggerated skin fold extends from the forelimbs, along the body, to the hind legs, to form a wingspread

which is very large in contrast to the animal's size.

Although bats are for the most part harmless, and in fact perform an invaluable service to mankind in the enormous quantity of insects they consume, they have been widely maligned. Even scientists have been known to lose their objectivity in discussing them. One such, discussing the false vampire bat, America's largest bat with a wingspread of  $2\frac{1}{2}$  feet, let something of his personal feelings appear in this statement: "The name is a misnomer, for the bat is known to be quite harmless, but its physiognomy is hideous."

The word hideous sums up much of the horror with which many humans tend to view these flying animals. A common belief is that bats frequently get tangled in human hair, even that they eagerly strive to. Some people, city folk presumably, extend this fear to harmless barn swallows swooping low in the dusk.

Actually, a bat will go to great lengths to stay out of people's hair. After sleeping all day, usually in a cave hanging head down, bats come out at night to feed. They fly swiftly, veering this way and that, catching insects as they fly.

To avoid collisions they depend largely on a sound mechanism that is believed to work on the radar principle. They are extremely sensitive to sound, and the echoes of sounds they themselves make in flight guide them through their extremely tricky aerial maneuvers. Each bat flies with the dash and skill of a Hot-Shot Charlie, and if a human being, especially an hysterical one, looms up ahead, any bat in its right mind would pull back hard on the stick and cut out.

Science News Letter, February 11, 1950

### NUCLEAR PHYSICS

## Exploding Atoms Measure Thickness of Materials

➤ A PEACETIME use of radioactive materials from the government's atomic energy laboratories at Oak Ridge, Tenn., was revealed at the meeting of the American Institute of Electrical Engineers in New York.

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It is as the vital part of a gage to measure the thickness of sheets of metal, rubber, plastic or other materials as they emerge in a continuous stream from machines in which they are made or formed.

The gage was described by C. W. Clapp and Stanley Bernstein, General Electric scientists. It makes the measurements continuously and automatically, without touching the material, they said.

The radioactive material showers beta rays (high-speed electrons) on the sheets being measured. An electronic device measures the quantity of rays passing through. The thicker the material, the fewer the rays that pass through, they explained. In the past, it has usually been necessary to stop machinery to make checks of thickness.

Science News Letter, February 11, 1950

### ENGINEERING

## Electric Transformer Noise Is Problem

➤ NOISE from the increasing number of transformers used to cut high-tension electric current to lower voltages are giving electrical engineers much concern, judging from the number of papers on the subject presented to the American Institute of Electrical Engineers.

It is an increasing problem due to increasing demands for electrical power and the expansion programs to meet the demands. Many of these transformers are installed outdoors, sometimes near residential and business districts.

The basic cure rests with transformer builders and designers, the engineers were told by C. E. Baugh of the Pacific Gas and Electric Company, San Francisco.

The use of a "Harmonic Index" as an approach to reducing transformer noises was explained by W. H. Mutschler, Jr., and T. F. Madden of the Allis-Chalmers Company, Pittsburgh, Pa. Harmonic Index, the difference between certain decibel readings, was offered as a method of evaluating the effects of changes in transformer construction and materials to overcome transformer noises.

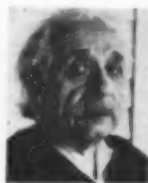
Among the details of transformer construction listed as contributing to noise production were the kind of steel used for the core, the resonance of the transformer's mechanical structure, the side frames and the winding assembly. The oil in which the transformer is immersed transmits the noises to the tank itself. This may contribute further to the noise because of resonances caused by the many small areas it is broken up into by radiators and other members welded into the tank wall.

The elimination of sources of resonance in the structure of the transformer seems to be the preferred method of getting rid of the noise. Sound-absorbing enclosures have been developed, but they are costly.

Science News Letter, February 11, 1950

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by ALBERT EINSTEIN



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# Books of the Week

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ADVANCES IN AGRONOMY, Vol. I—A. G. Norman, Ed.—*Academic Press*, 439 p., illus., \$7.50. A survey and review of progress in agronomic research and practice by a group of leading specialists.

AN ANALYSIS OF SPECULATIVE TRADING IN GRAIN FUTURES—Blair Stewart—United States Department of Agriculture, *Gov't. Printing Office*, Tech. Bull. No. 1001, illus., paper, 30 cents. A study presenting the operations of nearly 9,000 small traders over a 9-year period.

CAREER OPPORTUNITIES FOR GRADUATE VETERINARIANS IN THE BUREAU OF ANIMAL INDUSTRY—United States Department of Agriculture—*Gov't. Printing Office*, Misc. Publ. No. 671, 18 p., illus., paper, 10 cents.

A CENTURY OF ENTOMOLOGY IN THE PACIFIC NORTHWEST—Melville H. Hatch—*University of Washington Press*, 42 p., illus., \$1.50. A study of the principal events, and the citing of the more important books, papers, and collections involved in the development of this region.

THE CHILD'S FIRST DAYS IN NURSERY SCHOOL—Doris Campbell—*New York Committee on Mental Hygiene*, 14 p., paper, 15 cents. Many problems arising are discussed. For those in nursery school education.

COMPARATIVE ANATOMY LABORATORY MANUAL—Lloyd Raymond Gribble—*Blakiston*, 231 p., illus., paper, \$3.00. A guide in the dissection and comparative studies of such animals as carp, frog, alligator, pigeon, bat, sheep, dogfish, turtle, chicken, and woodchuck.

A DICTIONARY OF WORD MAKERS: Pen Pictures of the People Behind Our Language—Cecil Hunt—*Philosophical Library*, 176 p., illus., \$3.75. Short biographies of those people whose names have passed into our language as Downing of Downing Street, Morse of the Morse Code and Sax of saxophone.

DOCUMENTATION—S. C. Bradford—*Public Affairs Press*, 156 p., \$3.00. Information on the nature, origin, and purpose of documentation, with a strong plea for the universal decimal classification system. The author was Librarian of the Science Museum Library of the Imperial Institute in London.

ENGINEERING MECHANICS—Archie Higdon and William B. Stiles—*Prentice-Hall*, 505 p., illus., \$6.75. A text emphasizing the understanding of principles employed in the solution of problems.

FARM OWNERSHIP IN THE UNITED STATES—Buis T. Inman and William H. Fippin—*Gov't. Printing Office*, U. S. Dept. of Ag. Misc. Publ. No. 699, 77 p., illus., paper 20 cents. A discussion of large and small land holdings.

FOREST FIRE- DANGER MEASUREMENT IN THE EASTERN UNITED STATES—George M. Jemison, A. W. Lindenmuth, and J. J. Keetch—*Gov't. Printing Office*, Ag. Handbook No. 1, 68 p., illus., paper, 25 cents.

GEMS AND JEWELRY TODAY: An account of the Romance and Values of Gems, Jewelry, Watches and Silverware—Marcus Baerwald and Tom Mahoney—*Marcel Rodd*, 303 p., illus., \$10.00. The latest developments in the jewelry industry with a historical background

of the world gems. Three full-page color plates.

HOW A CHILD FEELS ABOUT ENTERING A NURSERY CENTER—Doris Campbell—*New York Committee on Mental Hygiene*, 9 p., paper, 15 cents. The child's feelings in starting nursery school. For the parent.

HOW TO BE A BETTER SPEAKER—Bess Sondel—*Science Research Associates*, 47 p., illus., paper, 60 cents. Many helpful hints on how to make a better speech.

INTERACTION PROCESS ANALYSIS: A Method for the Study of Small Groups—Robert F. Bales—*Addison-Wesley*, 203 p., illus., \$6.00. A progress report on methods, primarily for researchers in the field.

LOUIS PASTEUR: Free Lance of Science—Rene J. Dubos—*Little, Brown*, 418 p., illus., \$5.00. The life and work of this great experimenter, used by the author, who is a Rockefeller Institute for Medical Research member, as a vehicle for a study of the mechanisms and motivations of scientific life.

THE PHYSICAL WORLD—Paul McCorkle—*Blakiston*, 450 p., illus., \$4.25. An introductory text for a beginning college survey course in the physical sciences.

PREDICT YOUR OWN FUTURE—Donald G. Cooley—*Funk*, 278 p., illus., \$2.95. Cycles, trends, and rhythms occur in science and human affairs; their study and use always provide interesting discussion.

THE PRINCIPLES OF SCIENTIFIC RESEARCH—Paul Freedman—*MacDonald*, 222 p., \$3.05. A brief discussion by a British scientist of the problems one meets upon entering the field of scientific research. For those who are about to start their careers.

THE PSYCHOLOGIST IN INDUSTRY—M. E. Steiner—*Thomas*, 107 p., \$2.00. A monograph discussing the many problems of workers and their supervisors with particular emphasis on problems of the worker in the factory.

THE RADIO AMATEUR'S HANDBOOK—Headquarters Staff—*American Radio Relay League*, 27th edition, 605 p., illus., \$2.00. The standard manual of amateur radio communication brought up-to-date for 1950.

RADIO OPERATOR'S LICENSE Q & A MANUAL—Milton Kaufman—*Rider*, 608 p., illus., \$6.00. Questions and answers to past Federal Communication Commission's exams.

RAYON: THE FIRST MAN-MADE FIBER—Joseph Leeming—*Chemical Publishing Co.*, 203 p., illus., \$5.75. A semitechnical book containing the principal facts about the properties, method of manufacture, and uses of rayon.

REPORT OF THE COMMITTEE ON THE MEASUREMENT OF GEOLOGIC TIME 1948-1949—John Putnam Marble, Chairman—*National Research Council*, 139 p., illus., paper, \$1.00.

THE SANDHILL CRANES—Lawrence H. Walkinshaw—*Cranbrook Institute of Science*, Bulletin No. 29, 202 p., illus., \$3.50. The results of 15 years' investigation of four subspecies of Sandhill Crane in Alaska, Canada, the United States, Cuba, and the Isle of Pines.

SAY IT WITH YOUR CAMERA: An Approach to Creative Photography—Jacob Deschin—

*Whittlesey House*, 230 p., illus., \$3.00. The author puts emphasis on "what" and "when" to photograph rather than just technique. Primarily for the amateur.

SCIENCE IN EDUCATION—M. C. Nokes—*MacDonald*, 158 p., \$2.00. Of British origin and intended primarily for teachers and those training for the teaching profession. Written in non-technical language.

SCIENTIFIC AND TECHNICAL ABBREVIATIONS, SIGNS AND SYMBOLS—O. T. Zimmerman and Irvin Lavine—*Industrial Research Service*, 2nd ed., 541 p., \$8.00. (\$9.00 outside the United States). An American standard reference work brought up-to-date. Includes only those letter symbols used in this country.

SEVENTH SEMI-ANNUAL REPORT OF THE ATOMIC ENERGY COMMISSION JANUARY 1950—Atomic Energy Commission—*Gov't. Printing Office*, 228 p., paper, 50 cents. The major developments and the status of the programs for the past six months, including a description of basic nuclear science worthy of reference space alongside the Smyth report.

STATISTICAL HANDBOOK OF CIVIL AVIATION—Civil Aeronautics Administration—*Gov't. Printing Office*, 127 p., illus., paper, 50 cents. This edition contains all the available developments through June, 1949.

SLIPSTREAM: The Autobiography of an Air Craftsman—Eugene E. Wilson—*Whittlesey House*, 328 p., \$4.50. The coming of age of the airplane.

A STUDY OF THE QUALITY OF ABACA FIBER—Earl E. Berkley and others—*Gov't. Printing Office*, U. S. Dept. of Ag. Tech. Bull. No. 999, 56 p., illus., paper, 20 cents. Information on a cordage fiber.

WHAT NURSERY SCHOOL IS LIKE—Doris Campbell—*New York Committee on Mental Hygiene*, 10 p., paper, 15 cents. Discusses the activities and goals of the average nursery school. For parents.

KELLY'S FARM—Edith Thacher Hurd—*Lothrop, Lee and Shepard*, 64 p., illus., \$2.00. The story of a young boy's adventures on a farm. The authors have used their own recent experiences in country living as background.

YEARBOOK—Francis D. Curtis—*Ginn*, 168 p., illus., 18 cents. A high school biology laboratory manual. To be used with *Biology in Daily Life* by Curtis and Urban, Ginn.

Science News Letter, February 11, 1950

Every quart of skim milk contains about half an ounce of *casein*, a substance with many uses from making textile fiber to cement and paint.

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❁ **RADIATION COUNTER**, for laboratory and factory personnel working with radioactive substances, has a platform for the feet and cavities on two upright posts for the hands. When hands and feet are properly placed, a red, yellow or green light flashes to indicate whether decontamination is needed.

Science News Letter, February 11, 1950

❁ **PEEPHOLE FOR DOORS**, by means of which a person wanting admission can be inspected, consists of a tube invisible from the outside which can be rotated to give a wide range of vision. Padded to be noiseless, this recently patented device has a single lens in the tube.

Science News Letter, February 11, 1950

❁ **BLIND STITCH ATTACHMENT** for a widely used sewing machine is a practical, easy-to-use device which produces invisible hemming with perfect blind stitches. It is attached when needed to the sewing machine in place of the presser foot.

Science News Letter, February 11, 1950

❁ **THREE-POWER BINOCULARS**, which may be worn like ordinary glasses as shown in the picture, are easily focused



by a simple fingertip motion. They are light in weight, being made of aluminum, with nose piece and temples of plastic.

Science News Letter, February 11, 1950

❁ **MOISTURE-RESISTANT BAG**, to hold a rose bush or other plant during shipment and until replanted, is made of double layers of polyethylene film, heat-sealed

around the edges to prevent moisture from escaping. A special wax prevents moisture loss through the plant itself.

Science News Letter, February 11, 1950

❁ **DEFROSTING SYSTEM**, automatic and rapid in operation, is a feature of a new combination household refrigerator-freezer. Defrosting requires about three minutes under ideal conditions, and the refrigerator may continue to be used during the period.

Science News Letter, February 11, 1950

❁ **WHEELED GUARD** is used at an aircraft factory to protect ground crew men from the jet intakes on military planes under stationary tests with engines in operation. The castored, heavy frame and wire device fits under the nose of a plane covering both air intakes.

Science News Letter, February 11, 1950

❁ **LAWN MOWER**, of a new type, recently patented, has a stationary low-placed cutting bar with forward projecting triangular teeth, and a series of circular rotating blades on a powered shaft which parallels the axle of the machine. These rotators force vegetation of any height against the triangular teeth.

Science News Letter, February 11, 1950

## Do You Know?

Headaches come in about 47 different types.

The largest use made of *nickel* in America is in steel alloys.

Pure *nickel* is used for cathodes in television cameras and picture tubes.

*Fluorspar* is the mineral from which the Freons used in refrigerator and cooling systems are made.

The ancestor of the American *celery* is a wild plant of Europe which grows in swamps from Sweden southward to Africa.

Glass for *television tubes* may contain up to 30% by weight in lead to increase electrical resistivity and give high light dispersion.

Petroleum consumption is a good measure of a country's standard of living; in the United States per capita consumption of crude oil and its liquid products amounts to 575 gallons a year.

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